NEW YORK STATE OF OPPORTUNITY. | Department of Public Service

Electric Vehicle Supply Equipment and Infrastructure Technical Conference and EV Readiness Working Group

Session 3: April 7, 2020

Session Three Agenda // April 7, 2020

2:00 PM	Zeryai Hagos, Department of Public Service • Introduction
2:10 PM	Kevin Miller & Mike Walters, ChargePoint • Reactions for Forecasted Level 2 and DCFC Developer Economics
2:30 PM	Chris King, SVP Policy & Regulatory Affairs, Siemens eMobility • Open standards, interoperability, and smart charging
2:50 PM	Annie Gilleo, Greenlots • Managed Charging Strategies, Program Flexibility
3:10 PM	Andrew Dick, ElectrifyAmerica • Reactions to Forecasted DCFC Developer Economics
3:30 PM	Facilitated Discussions • Bundling and Cost Management • Developer Economics • Future Proofing
5:00 PM	Closing Remarks

Submit Questions To

EVSE@DPS.NY.GOV

Closing Remarks

Upcoming Meetings

COVID-19 Informational Session

- 2:30 pm – 3:30 pm, 4/10/2020
- COVID-19 NYS, Programmatic and Regulatory Response
- Open Q&A Session

Written comments – white paper

- April 27, 2020 – initial comments due
- May 11, 2020 – reply comments due

Key white paper questions in Feb 5, 2020 Secretary's Notice, DMM #18-E-0138

Reaction to EVSE Developer Economics

Presenter: Kevin George Miller

EV Make-Ready Conference – Session Three

New York Public Service Commission Docket No. 18-E-0138

April 7, 2020

There is no ubiquitous EV charging business model

Giving drivers a place to plug in helps to achieve a variety of operating & business goals

Home

MANAGE CHARGING & SAVE MONEY

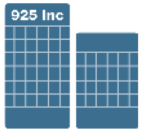
+ Track usage and expenses
+ Charge during low cost off-peak hours

Fleet

LOWER COST OF TRANSPORTATION

+ Meet government mandates and regulations
+ Reduce operating expenses with lower fueling and maintenance costs
+ Proactively manage expenses
+ Achieve sustainability goals

Workplaces



ATTRACT & RETAIN TALENT

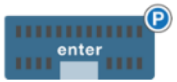
+ Increase employee satisfaction
+ Improve productivity
+ Achieve sustainability goals

Multi-Family Homes / Commercial Property

ATTRACT & RETAIN RESIDENTS & TENANTS

+ Increase average rent and property value
+ Provide valued amenity
+ Meet emerging state and city regulations
+ Achieve sustainability goals

Parking



ATTRACT NEW CUSTOMERS

+ Drive revenue
+ Provide differentiating amenity

Retail & Hospitality

INCREASE SALES

+ Attract new and repeat customers
+ Increase shopping time
+ Boost customer satisfaction
+ Achieve sustainability goals

Offering charging services is more than just a direct revenue model for commercial site hosts

Wide Variability in DCFC CapEx Costs

Description	Two 50kW Class Chargers		Two 150kW Class Chargers	
	Low	High	Low	High
Site Acquisition	$ -	$ 25,000	$ -	$ 25,000
DCFC Equipment	$ 60,000	$ 100,000	$ 120,000	$ 220,000
Electrical Panels and Switchgear	$ 6,000	$ 20,000	$ 14,000	$ 29,000
Engineering, Design, Permitting	$ 5,000	$ 14,000	$ 8,000	$ 16,000
Utility Upgrades	$ 4,000	$ 50,000	$ 35,000	$ 100,000
Project Management	$ 8,000	$ 12,000	$ 9,000	$ 18,500
Construction Costs	$ 45,000	$ 200,000	$ 90,000	$ 260,000
Total	**$ 128,000**	**$ 421,000**	**$ 276,000**	**$ 668,500**

+ *Data from table is not specific to ChargePoint equipment and reflects trends in cost of development and deployment around the country.*

DCFC Cost Assumptions

Internal Cost Assumptions (Four-Port Deployment)

	4 x 50kW		4 x 150kW	
	Low	*High*	*Low*	*High*
Make Ready	$ 136,000	$ 592,000	$ 312,000	$ 847,000
Equipment	$ 120,000	$ 200,000	$ 240,000	$ 440,000
Total	$ 256,000	$ 842,000	$ 552,000	$ 1,337,000

Whitepaper Cost Assumptions

	DCFC Capital Expenditures Costs			
	Upstate		NY Metro	
	4 X 150 kW	4 X 50 kW	4 X 150 kW	4 X 50 kW
Make-Ready	$200,000	$112,500	$363,881	$204,760
Charger	$200,000	$120,000	$200,000	$120,000
Total	$400,000	$232,500	$563,881	$324,760

Make Ready - Due to variability in utility and customer side make ready, site make ready is consolidated.

Comparing DCFC Cost Assumptions

Comparison of Upstate Assumptions

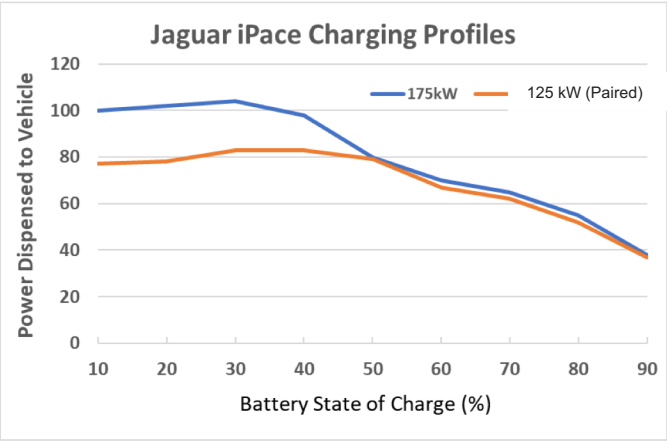
	4 x 50kW		4 x 150kW	
	Low	*High*	*Low*	*High*
Make Ready	$ 136,000	$ 592,000	$ 312,000	$ 847,000
Equipment	$ 120,000	$ 200,000	$ 240,000	$ 440,000
Total	$ 256,000	$ 842,000	$ 552,000	$ 1,337,000
Upstate Delta	$ (23,500)	$ (609,500)	$ (152,000)	$ (937,000)
Whitepaper - Upstate	$ 232,500	$ 232,500	$ 400,000	$ 400,000

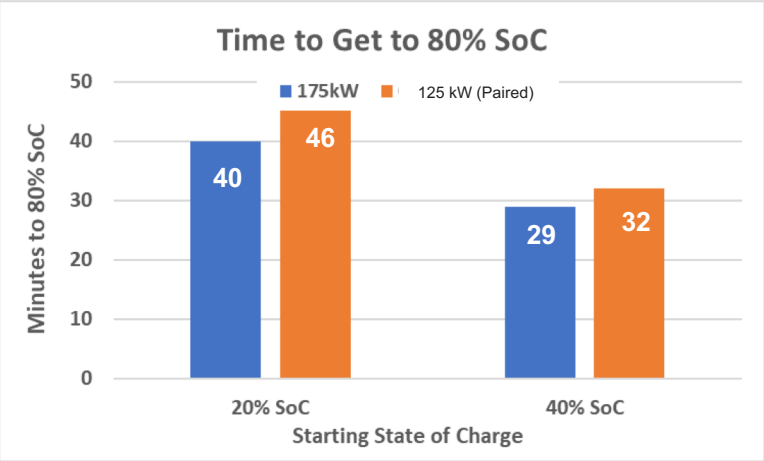
Comparison of NYC Metro Assumptions

	4 x 50kW		4 x 150kW	
	Low	*High*	*Low*	*High*
Make Ready	$ 136,000	$ 592,000	$ 312,000	$ 847,000
Equipment	$ 120,000	$ 200,000	$ 240,000	$ 440,000
Total	$ 256,000	$ 842,000	$ 552,000	$ 1,337,000
NYC/Metro Delta	$ 68,760	$ (517,240)	$ 11,881	$ (773,119)
Whitepaper - NYC Metro	324,760	324,760	563,881	563,881

DCFC OpEx Cost Drivers

- If in-depth modeling is needed, best to use conservative assumptions
  - Whitepaper contrasts 10-year IRR starting w/ 3 vs. 2 sessions/port/day (Upstate) with four 50kW EVSE. However, 1 to 1½ sessions/port/day may be more appropriate.
- Higher-power stations, particularly in early years of the program, will increase costs without appreciably improving throughput (i.e., charging time per vehicle).





* Source: Data published by Fastned, EU

Wide Variability in Level 2 CapEx Installation Costs

Light-Duty Electric Vehicle Supply Equipment Type				
Geographic Region	**Equipment**		**Installation**	
	Low	*High*	*Low*	*High*
Upstate	$4,500	$7,210	$6,000	$15,000
NYC Metro	$1,500	$4,500	$6,000	$30,000

+ *Data from table is not specific to ChargePoint equipment and reflects trends in cost of development and deployment around the country.*

Takeaways

- CapEx costs for L2 and DCFC vary significantly across utility service territories.
  - Higher costs may be unavoidable given on-site needs and program requirements.
  - Workplace goals (79K ports) may be difficult to achieve at lower make-ready value.
  - Allowing greater flexibility on a site-by-site basis would allow NY to learn from early deployments and fine tune program requirements at a mid-point review.
- OpEx costs also vary wildly across utility service territories.
  - Impacted by evolving charging behavior, rates, exogenous factors, etc.
  - Low utilization can be exacerbated if programs require a higher number of ports-per-site than can be supported for given levels of EV adoption.
  - OpEx impact from decisions about CapEx requirements (e.g., power level or minimum ports) can inadvertently exclude otherwise appropriate program participants.

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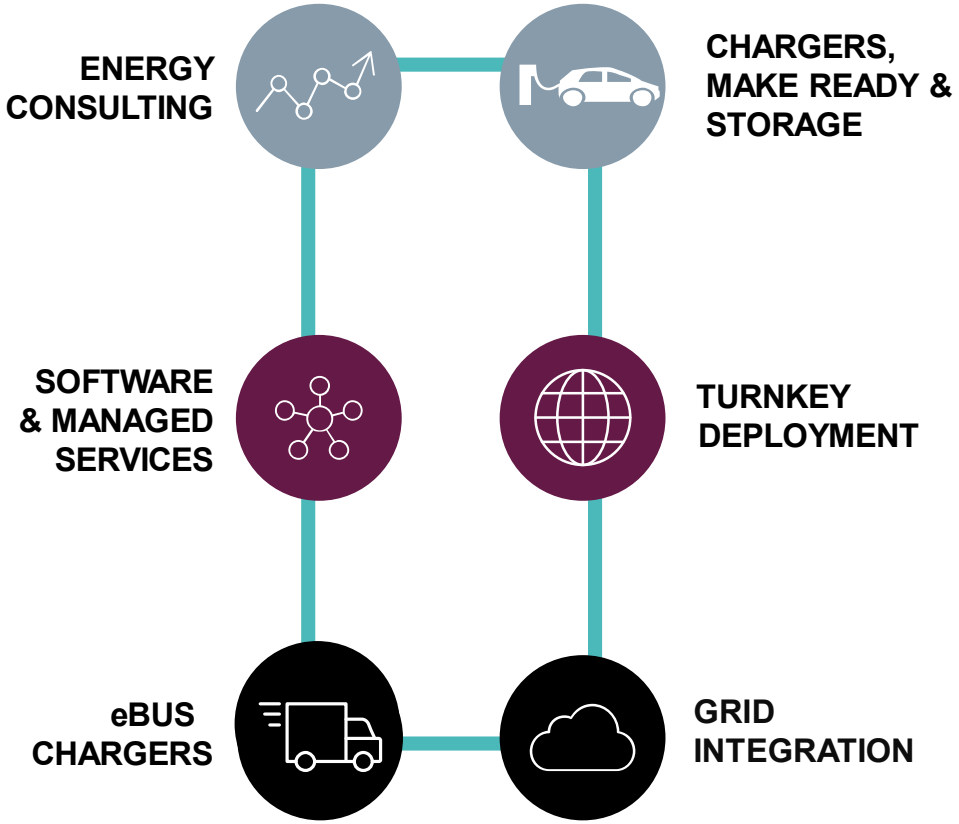
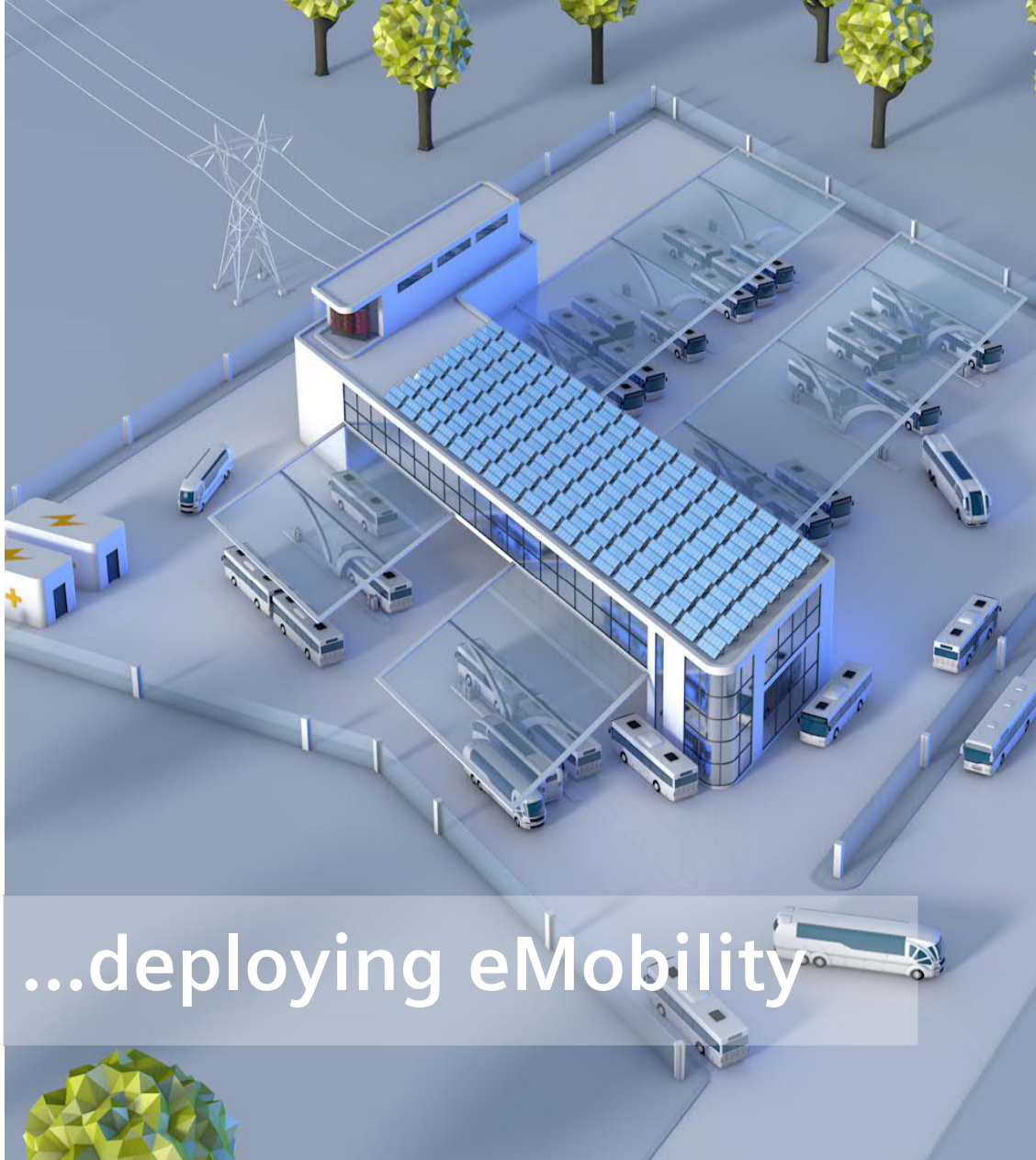
Smart/Managed Charging, Standards, and Interoperability

Chris King, SVP – Policy & Regulatory Affairs
Siemens eMobility

eMobility® at Siemens





Benefits of EV charging to Non-EV Ratepayers

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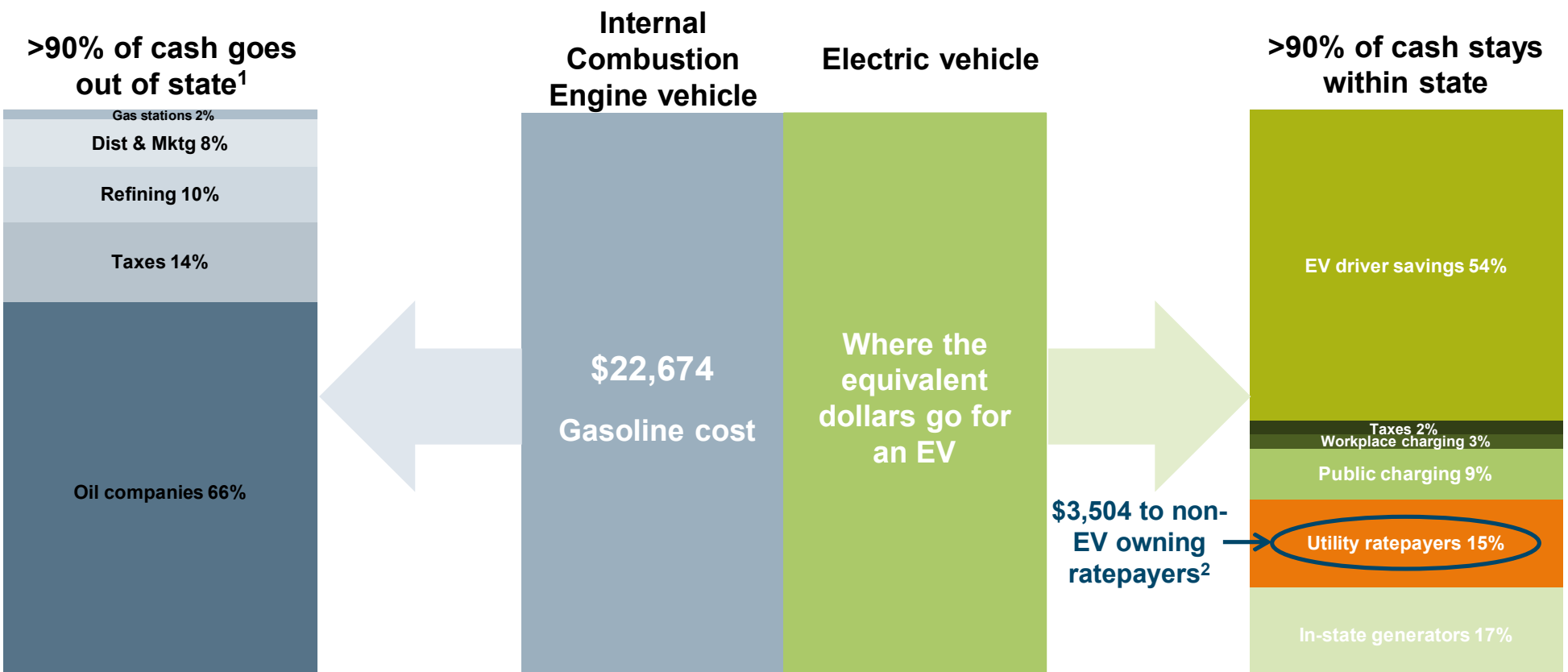

[1] – percentage is lower for oil-producing states

[2] – EV charging revenue paid for T&D portion of electricity rates; assumes 90% of charging is off-peak and, therefore, minimal T&D investment is required

Sources: Energy Information Administration, Union of Concerned Scientists, Siemens

Grid Simulation: Unmanaged Charging Behavior

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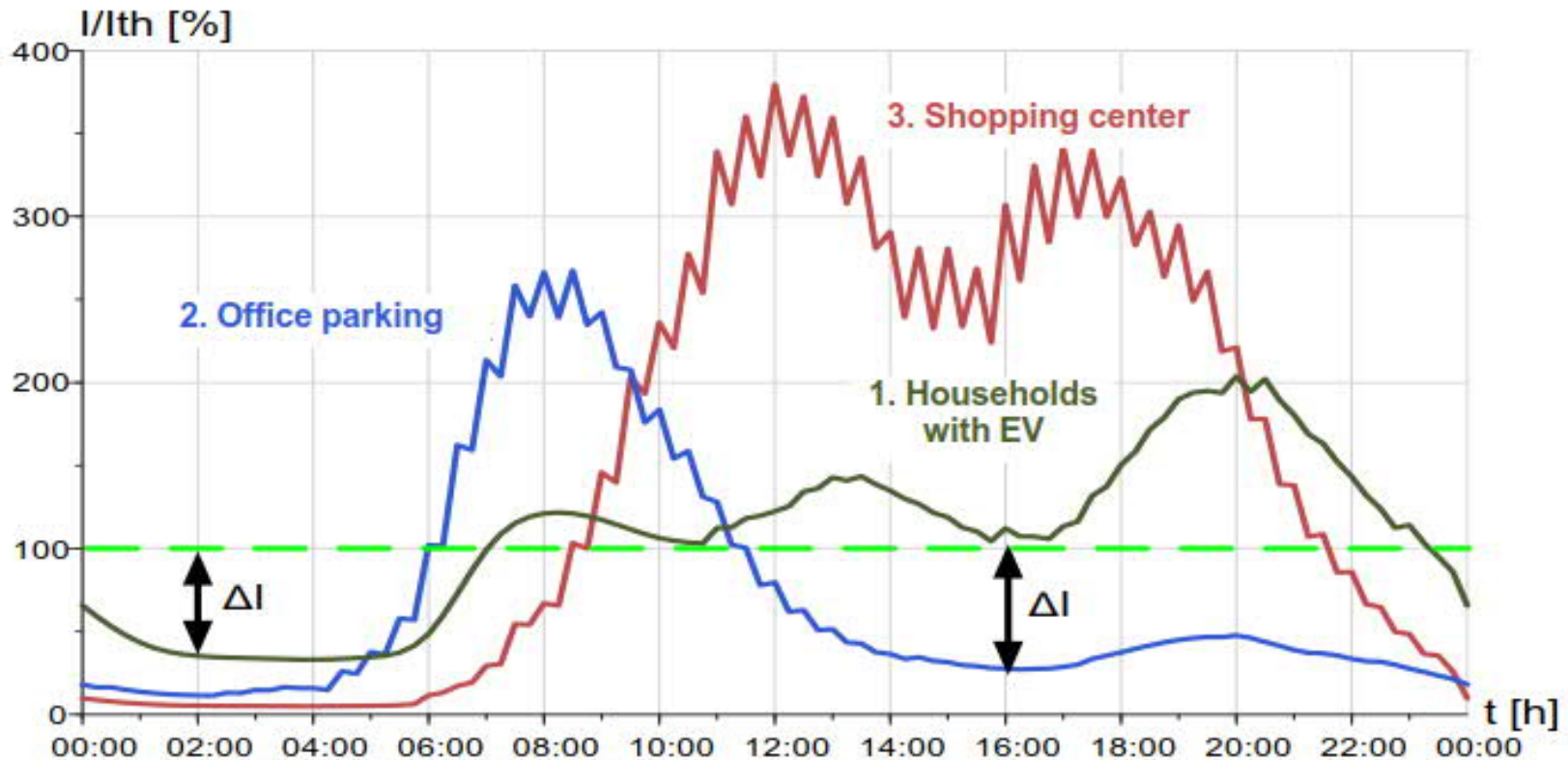
Based on a real distribution grid

- 50% of vehicles are EVs
- City of 20,000

These are ***long-dwell*** use cases

DC Fast Charging at ***opportunity*** locations is not a good candidate for managed charging



Grid Benefits from Smart Charging

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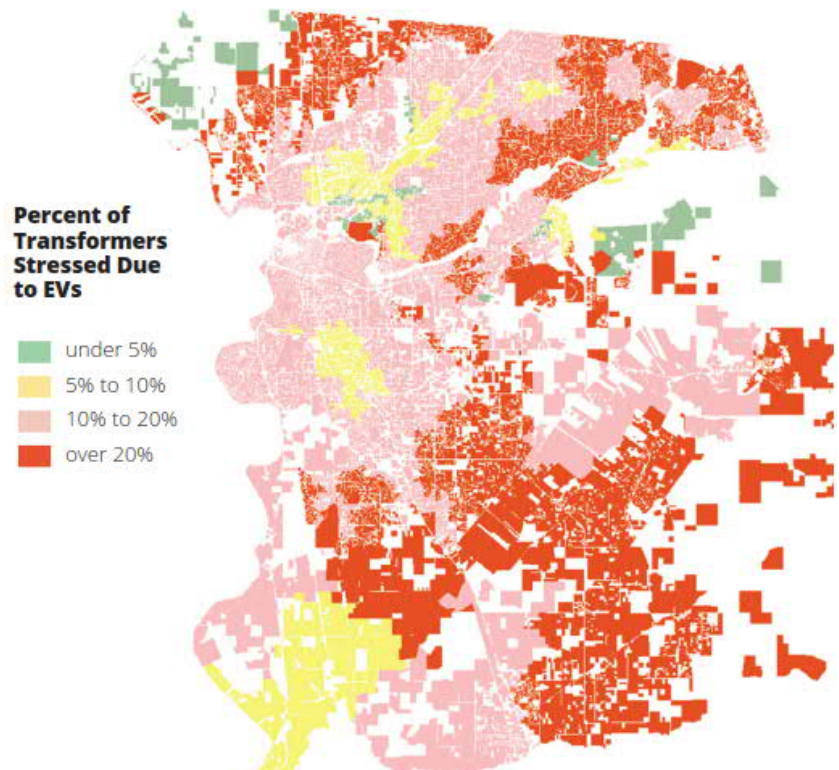
Managed charging can:

- Improve grid economics by achieving higher utilization rates of assets
- Reduce emissions by aligning charging with surplus renewable generation
- Reduce grid stress and maintain grid stability by minimizing charging ramp rates and reducing the strain on distribution transformers
- Reduce the need for new peak generation and distribution capacity resulting from EVs charging during peak hours

In sum: preserve the benefits of increased revenue from increased kWh throughput through the T&D grid

Effects on unmanaged charging:

FIGURE 3: EV IMPACT ON TRANSFORMERS IN THE SACRAMENTO MUNICIPAL UTILITY DISTRICT SERVICE TERRITORY THROUGH 2030



Source: Smart Electric Power Alliance, Black & Veatch, and SMUD, 2017

The Market Opportunity

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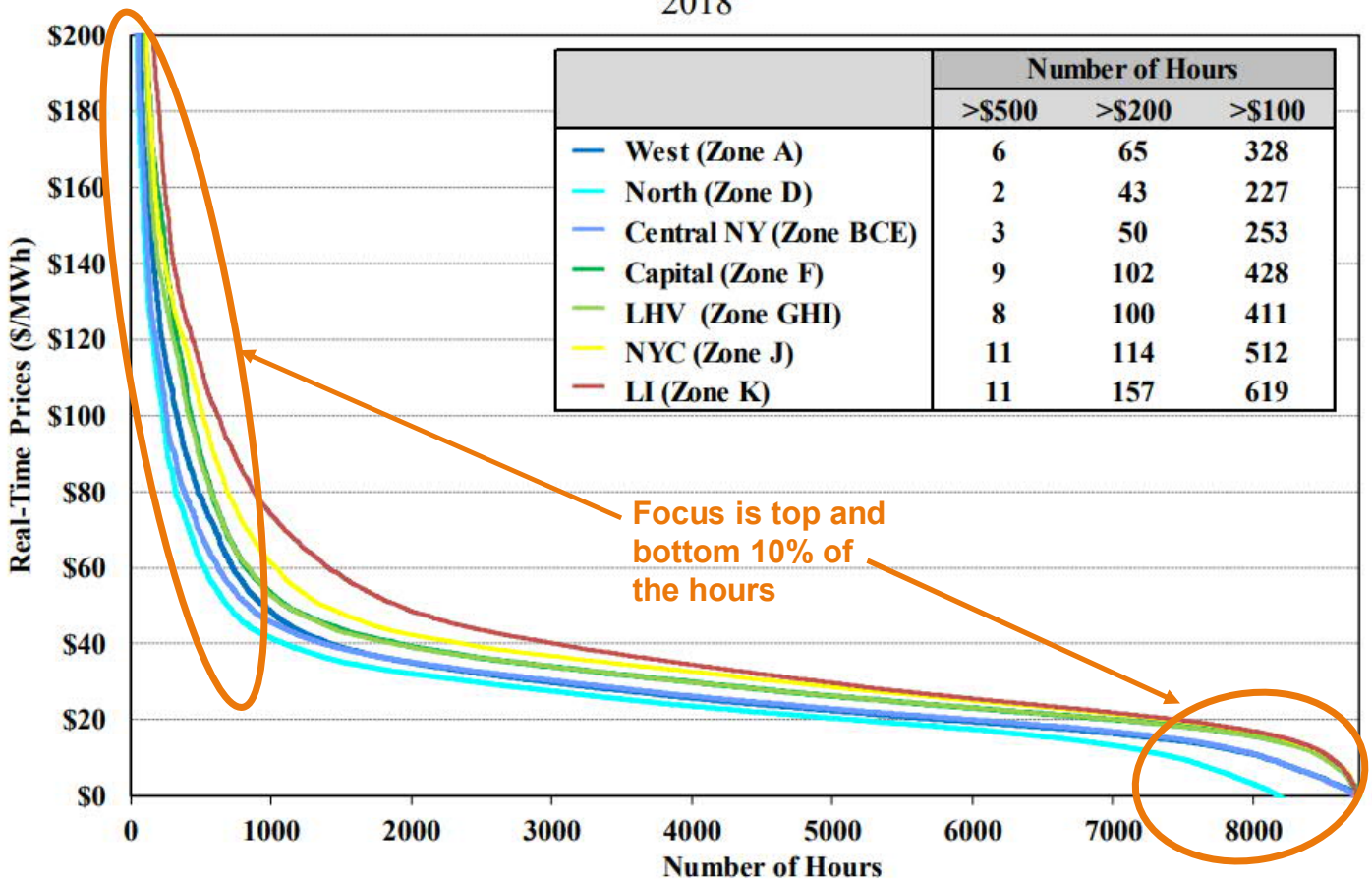
Figure A-4: Real-Time Price Duration Curves by Region
2018



	Number of Hours		
	>$500	>$200	>$100
West (Zone A)	6	65	328
North (Zone D)	2	43	227
Central NY (Zone BCE)	3	50	253
Capital (Zone F)	9	102	428
LHV (Zone GHI)	8	100	411
NYC (Zone J)	11	114	512
LI (Zone K)	11	157	619

Source: 2018 State of the Market Report for the New York ISO Markets

Who Benefits from Smart Charging?

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EV Driver

- ✓ Lower fuel costs
- ✓ Information
  - Cost to charge
  - kWh quantity
- ✓ Convenience
- ✓ Seamless payment

Site Host

- ✓ Improved utilization
- ✓ Demand charge optimization
- ✓ Management tools
- ✓ Equipment monitoring

Utilities

- ✓ Promote EV adoption
- ✓ Load visibility
- ✓ Peak demand management
- ✓ Grid and market integration

Elements of Smart Charging

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- Utility / ISO Load Control
- Aggregator Managed Direct Control
- Customer Response to Pricing Strategies
- Remotely Programmed & Controlled
- Price Signals: TOU, Hourly, Dynamic, EV-only tariffs
- Microgrids & Nanogrids

LEVERAGING THE FLEXIBILITY OF EVs

Interoperability

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The need for standards

To **drive down costs and, consequently, prices to customers** by having manufacturers compete to deliver products to the same specification

(Note: Standards are for minimum functionality, manufacturers can always add more features)

To **lower the risk of stranded assets**

by ensuring that different EVSPs can interface to chargers in a vendor-neutral manner (critical in case of business failure/exit of an EVSP)

To **protect customer choice and avoid vendor lock-in**

- by enabling EV drivers to easily pay for charging at any public site, and
- by enabling charger owners to easily switch EVSPs or EVSE suppliers (for new units) if desired

Technical (Metering and Communications) Standards
Home, MUD, Workplace, Fleet Charging

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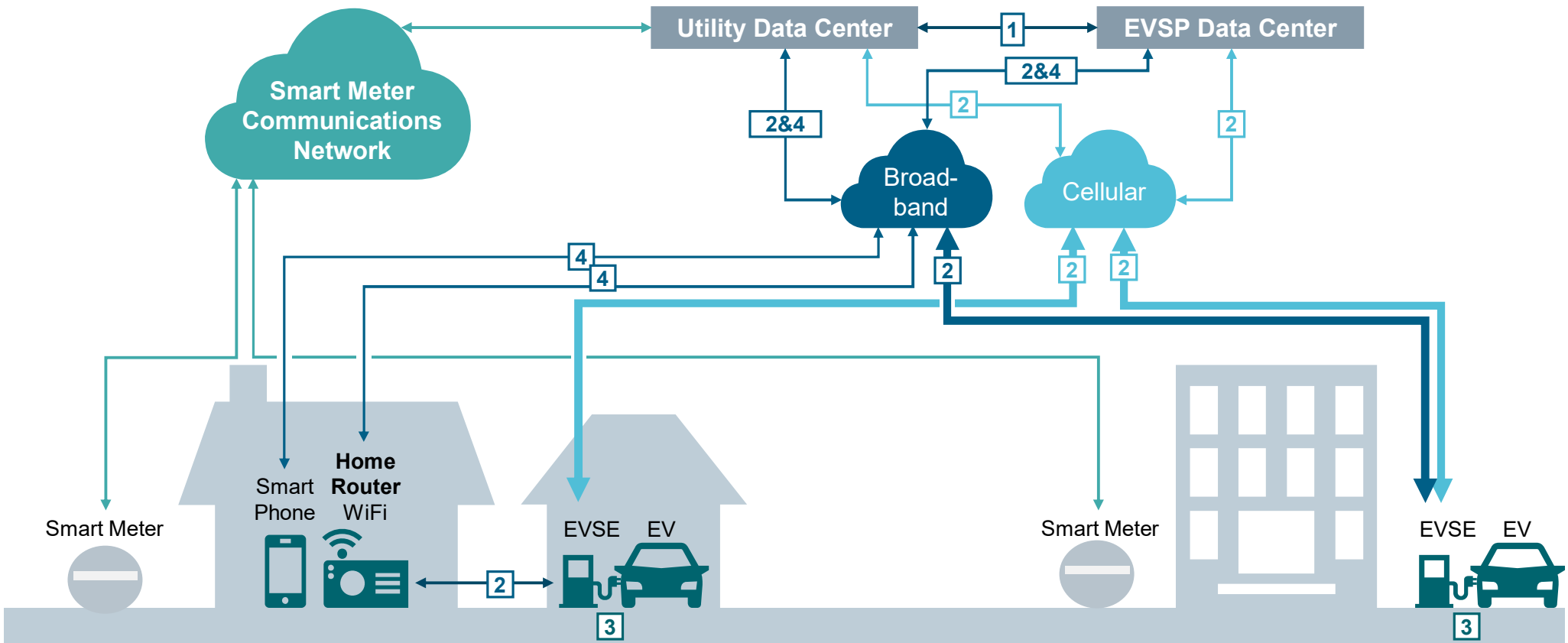

1 OpenADR and OCPI 2 OCPP, OpenADR, IEEE 2030.5 3 SAE J1772 (plug),ISO/IEC15118 (EV to EVSE) 4 IP

Communications Standards – Public Charging

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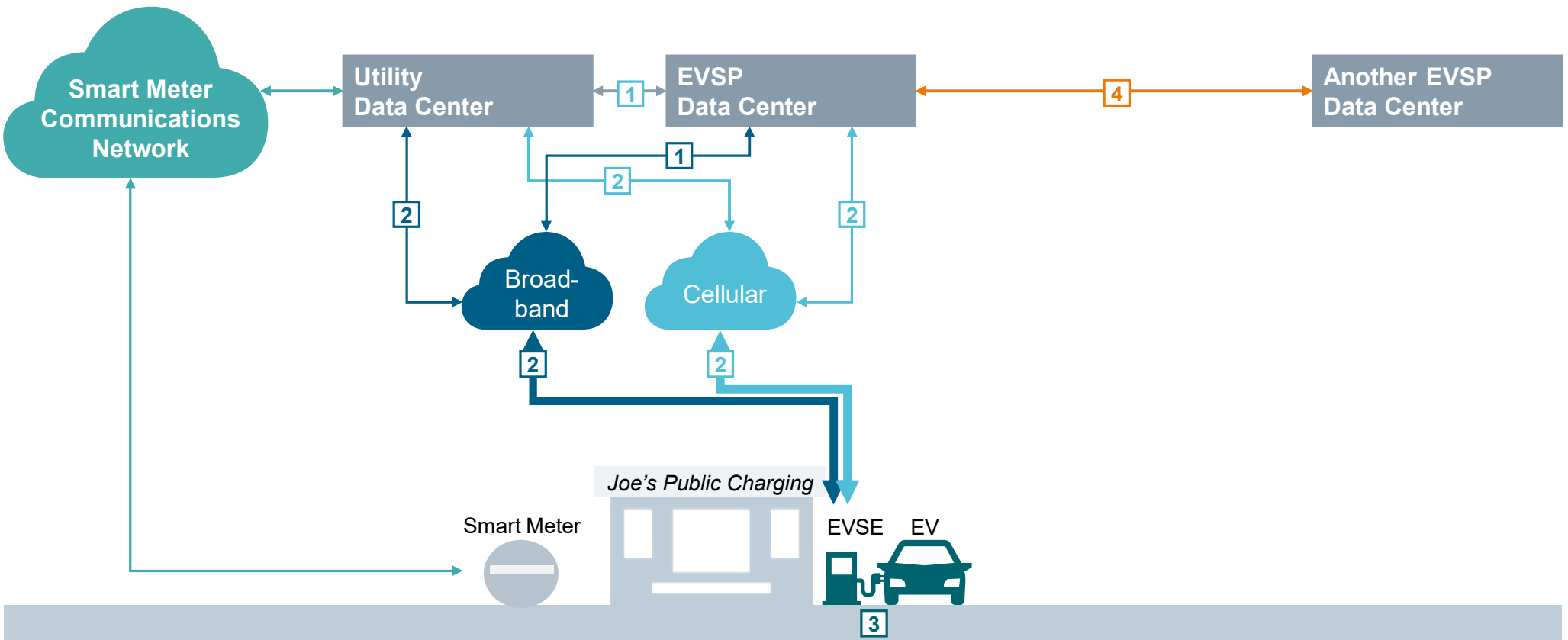

1 OCPP and OCPI 2 OCPP, OpenADR, IEEE 2030.5 3 SAE J1772, CCS, CHAdeMO (plug), ISO 15118 (EV to EVSE) 4 OCPI or OICP

Initial Comments

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Smart/managed charging

White paper: more needs to be known before large-scale active managed charging programs can be offered statewide

Comments: smart charging is already prevalent as DR use case; other use cases are evolving. Programs like smart thermostats provide good analogues. TOU pricing is foundational to derive smart charging benefits.

Interoperability

White paper: recommends encouraging open communications protocols, open access networks, and interoperability without penalizing proprietary technology

Comment: how can interoperability be achieved with communications protocols & payment to align with Commission precedent that requires connector interoperability while allowing proprietary technologies?

Next step on standards

White paper: establish working group to recommend baseline standards in engineering and safety, payment, communications, and interoperability

Comments: The WG should have actionable deliverables with specific timelines to be effective. Leverage work already achieved in other VGI WGs.